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44. Proposed by P. S. BERG, Principal of Schools, Larimore, North Dakota.

Two trees whose heights are 40 and 80 feet, respectively, stand on opposite sides of a stream 30 feet wide. What path does a squirrel take in leaping from the top of the higher to the top of the lower? What is the length of the path?

Solution by G. B. M. ZERR, A. M., Ph. D., Texarkana, Arkansas.

The path is a parabola. Let the top of the higher tree be origin, "across the river" positive, v=velocity, β=angle of projection, then the equation is $y=\tan\beta x-gx^2/(2v^2\cos^2\beta)$, in which we must know either v, or β. Substituting $x=30$, $y=-40$ we get

$$v^2=45g/(4\cos^2\beta+3\sin\beta\cos\beta)\ldots\ldots\ldots\ldots\ldots\ldots(1).$$

$$S=\frac{1}{v^2\cos^2\beta}\int_0^{30}\sqrt{v^4\cos^4\beta+(gx-v^2\sin\beta\cos\beta)^2dx}.$$

Let $v^2\cos^2\beta=a$, $gx-v^2\sin\beta\cos\beta=y$, $30g-v^2\sin\beta\cos\beta=y_1$, $-v^2\sin\beta\cos\beta=-y_2$.

$$\therefore\ S=\frac{1}{ag}\int_{-y_2}^{y_1}\sqrt{a^2+y^2dy}$$

$$=\frac{1}{2ag}\{y_1\sqrt{a^2+y_1^2}+y_2\sqrt{a^2+y_2^2}\}+\frac{a}{2g}\log[(\sqrt{a^2+y_1^2}+y_1)/(\sqrt{a^2+y_2^2}-y_2)]$$

Let $\beta=45°$; then $v^2=90g/7$, $y_1=165g/7$, $y_2=45g/7=a$.

$\therefore\ S=\frac{5}{14}(11\sqrt{130}+9\sqrt{2})+\frac{45}{14}\log[(\sqrt{130}+11)/(3\sqrt{2}-3)]$.

Let $\beta=0$; then $v^2=45g/4$, $y_1=30g$, $y_2=0$, $a=45g/4$.

$\therefore\ S=5\sqrt{73}+\frac{45}{8}\log[(\sqrt{73}+8)/3]$.

NOTES.

INTERNATIONAL CONGRESS OF MATHEMATICIANS AT ZURICH IN 1897.

"It is known that the idea of an international congress of mathematicians has been, above all in these latter days, the object of numerous deliberations on the part of scientists interested in its realization. It has appeared to them, by reason of the excellent results obtained in other scientific domains by an international 'entente', that assuring the execution of this project would have very weighty advantages.

As outcome of a very active exchange of views, accord was reached on a